

PATENT COOPERATION TREATY
PCT
INTERNATIONAL SEARCH REPORT
(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 12/65110/EJH/ar	FOR FURTHER ACTION	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. PCT/AU2005/000187	International filing date (<i>day/month/year</i>) 14 February 2005	(Earliest) Priority Date (<i>day/month/year</i>) 12 February 2004
Applicant THE UNIVERSITY OF QUEENSLAND et al		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of **6** sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. ☐ With regard to any nucleotide and/or amino acid sequence disclosed in the international application, see Box No. I.

2. ☒ Certain claims were found unsearchable (See Box No. II).

3. ☐ Unity of invention is lacking (See Box No. III).

4. With regard to the title,

☐ the text is approved as submitted by the applicant.

☒ the text has been established by this Authority to read as follows:

Live attenuated Salmonella for use as vaccine

5. With regard to the abstract,

☐ the text is approved as submitted by the applicant.

☒ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the drawings,

- a. the figure of the drawings to be published with the abstract is Figure No.

☐ as suggested by the applicant.

☐ as selected by this Authority, because the applicant failed to suggest a figure.

☐ as selected by this Authority, because this figure better characterizes the invention.

- b. ☒ none of the figures is to be published with the abstract.

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Box No. II Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claims Nos.: 1-6, 9-14, 16-19, 29, 31-35, 37-44
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
See extra sheet
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

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PATENT COOPERATION TREATY
PCT
INTERNATIONAL SEARCH REPORT
(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 12565110/EJH/ar	FOR FURTHER ACTION	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
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- a. the figure of the drawings to be published with the abstract is Figure No.

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- b. ☒ none of the figures is to be published with the abstract.

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See extra sheet
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Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

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Box No. IV Text of the Abstract (Continuation of item 5 of the first sheet)

The present invention relates to live attenuated *Salmonella* cultures for use as vaccines. The *Salmonella* cultures of the present invention have a substantially reduced capacity to grow and replicate in the presence of bile. The reduced capacity for growth is due to a metabolic-drift mutation induced by exposure to a combination of nalidixic acid and rifampicin for a time and under conditions sufficient to induce the mutation.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU2005/00018*

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. C12N 1/20; A61K 39/112

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC (WPIDS) AND CHEMICAL ABSTRACTS

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SEE BELOW

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPIDS, CA, MEDLINE. Keywords: salmonella, rifam?, nalidixic, naladixic, attenuat?, bile, sensitiv?, hst, nrm4, nrm8, nrm9, nrm15, nrm20, nrm25, nrm27, nrm29, rm4, rm8, rm9, rm15, rm20, rm25, rm27, rm29, rmm29, nm29

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 263 528 A2 (VEB Sachsches Serumwerk) 13 April 1988. See page 6, line 49.	7-8, 15, 20-28, 30, 36, 45-48
X	US 6,136,325 B1 (Linde et al.) 24 October 2000.	7-8, 15, 20-28, 30, 36, 45-48
X	Bjorkman et al., 1998, Proc. Natl. Acad. Sci. USA, vol. 95, "Virulence of antibiotic-resistant <i>Salmonella typhimurium</i> ", pages 3949-3953.	7-8, 15, 20-28, 30, 36, 45-48
A	Blanc-Potard et al., 1995, Mol. Gen. Genet., vol. 247, "RNA polymerase (rpoB) mutants selected for increased resistance to gyrase inhibitors in <i>Salmonella typhimurium</i> ", pages 680-692.	7-8, 15, 20-28, 30, 36, 45-48



Further documents are listed in the continuation of Box C



See patent family annex

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search
9 March 2005

Date of mailing of the international search report

23 MAR 2005

Name and mailing address of the ISA/AU

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/AU2005/000187

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member			
EP	0263528	DD	253152	DD	253183
				DE	253184
US	6136325	AU	75374/94	BR	9405578
		CN	1114100	EP	0642796
		US	6479056	JP	7206706
				WO	9507101
Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.					
END OF ANNEX					

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Box No. IV Text of the Abstract (Continuation of item 5 of the first sheet)

The present invention relates to live attenuated Salmonella cultures for use as vaccines. The Salmonella cultures of the present invention have a substantially reduced capacity to grow and replicate in the presence of bile. The reduced capacity for growth is due to a metabolic-drift mutation induced by exposure to a combination of nalidixic acid and rifampicin for a time and under conditions sufficient to induce the mutation.

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